

# ● PRINTER RUSH ●

(PTO ASSISTANCE)

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Application : 10/660,973 Examiner : Ali GAU : 3744  
From: MR Location: ADC FMF FDC Date: 07-14-05  
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DOC CODE	DOC DATE	MISCELLANEOUS
<input type="checkbox"/> 1449		<input type="checkbox"/> Continuing Data
<input type="checkbox"/> IDS		<input type="checkbox"/> Foreign Priority
<input type="checkbox"/> CLM		<input type="checkbox"/> Document Legibility
<input type="checkbox"/> IIFW		<input type="checkbox"/> Fees
<input type="checkbox"/> SRFW		<input type="checkbox"/> Other
<input type="checkbox"/> DRW		
<input type="checkbox"/> OATH		
<input type="checkbox"/> 312		
<input checked="" type="checkbox"/> SPEC	<u>09-12-03</u>	

[RUSH] MESSAGE: Page 2 of Spec 09-12-03 is missing.  
Please supply.

Thank you,  
UR

[XRUSH] RESPONSE:

OK

INITIALS: MM

NOTE: This form will be included as part of the official USPTO record, with the Response document coded as XRUSH.

REV 10/04

Ali

2/19  
EM2011

1 the aircraft for equipment, subsystem, and cockpit. For aircraft designed for  
2 high Mach number cruise, the conventional system uses fuel to cool the  
3 engine bleed air instead of using ram air because the ram air total  
4 temperature could be high and the ram air inlet increases drag. Significant  
5 safety pre-cautions have to be taken to mitigate the catastrophic failure that  
6 may occur if fuel leakage comes in contact with high temperature air. The  
7 ACS has a lower COP because of the high power required to compress air.  
8

9 (004) For high-speed flight, hybrid system combining ACS and VCS has  
10 been used for ram air drag reduction and fuel heat sink temperature  
11 matching. In the prior art, the heat rejection from equipment is first sunk into  
12 the VCS and then the heat rejection from VCS is transferred by the ACS and  
13 then dissipated into fuel and ram air. Because the ACS is inherently low in  
14 efficiency and it has to be designed to dissipate the cooling load and the  
15 work required by the VCS, there is a weight penalty. However, this approach  
16 is used because the VCS is more efficient in producing low temperatures  
17 using the phase change property of the refrigerant.

18

19 (005) With advent of high power electronics, the cooling loads are greatly  
20 increased, which exacerbates the problem. The bleed air that can be  
21 extracted from the engine for high speed-high altitude flight is relatively low;  
22 otherwise engine performance is significantly reduced. For an ACS,  
23 primarily using bleed air, becomes a less attractive solution. In addition, with  
24 high-speed cruise at Mach 2+, the aerodynamic heating contributed to the  
25 fuel tank temperature increases significantly and the ram air total  
26 temperature is high. The system design described herein addressed these  
27 issues using unique integration and cooling loads partitioning approach.  
28

29 (006) Thus, it is a primary object of the invention to provide an environmental  
30 control system for an aircraft.